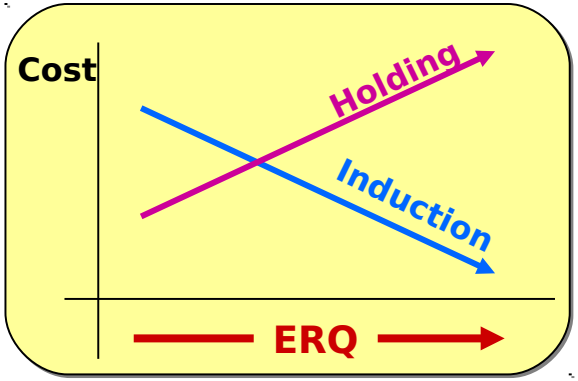
ECONOMIC REPAIR QUANTITY

- **Similar to the Concept of an Economic Order Quantity:**
  - **Due to the costs incurred each time we induct, it may be more economical to induct a monthly quantity of repairs at one time**
  - **Existence of an Economic Repair Quantity (ERQ) makes it possible to compute a Repair Requirement Objective (RO)**
  - **Repair-RO can be used to improve our repair metrics and authorization policy**

ERQ CONCEPT

Economic ORDER Quantity

- Quantity economical to Procure at the Reorder Point
- Used to provide an economical tradeoff between Holding Cost and Admin Procurement Cost
  - **Larger EOQ = Increased Holding Cost**
  - **Smaller EOQ = Increased Admin Cost**



Economic REPAIR Quantity

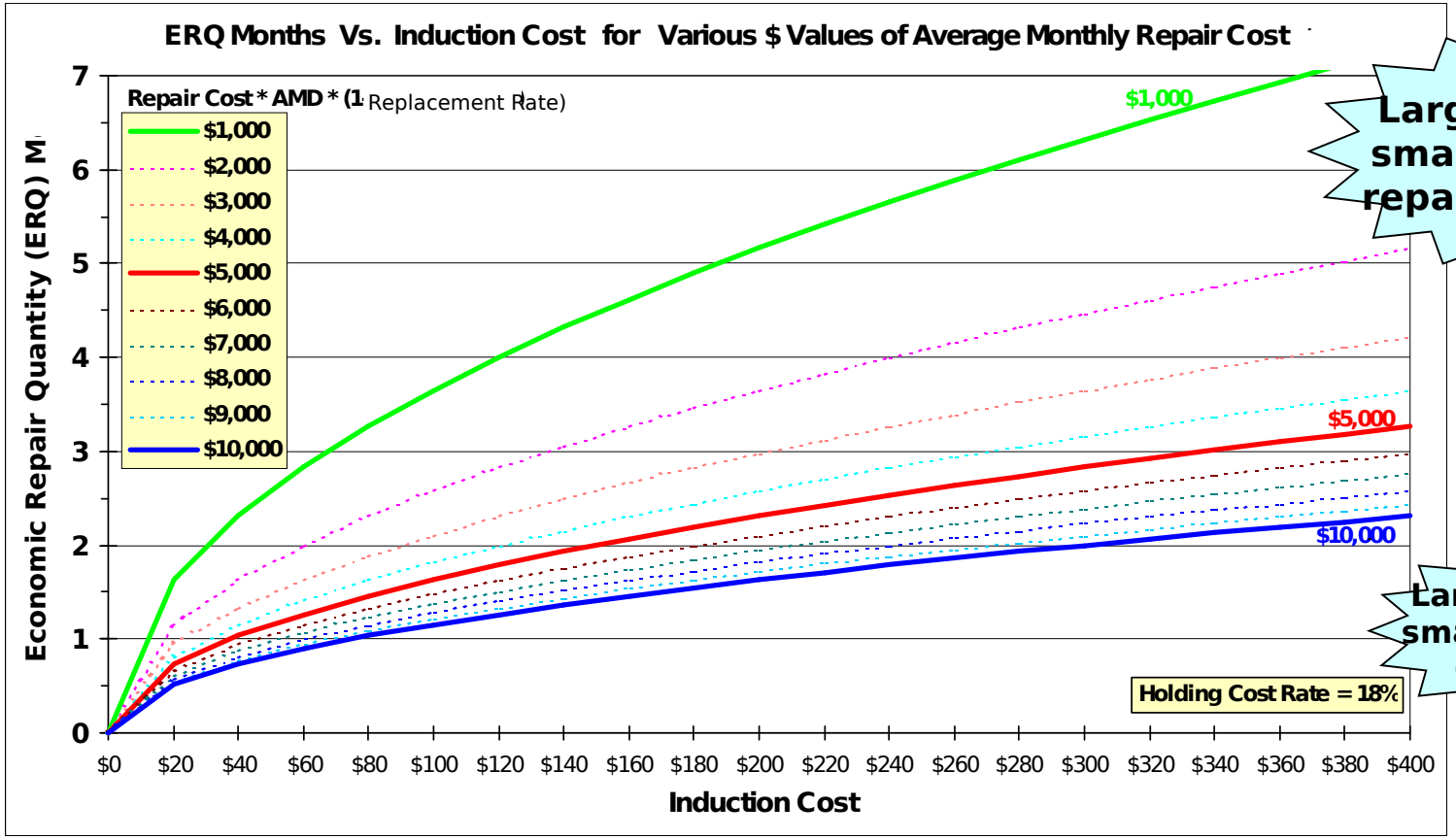
- Quantity economical to Repair at the RAP
- Used to provide an economical tradeoff between Holding Cost and Repair Induction Costs
  - **Larger ERQ = Increased Holding Cost**
  - **Smaller ERQ = Increased Induction Cost**
- Repair induction costs may include:
  - MSC/IOC/Depot Admin costs associated with authorizing repair funds/scheduling/etc.
  - DLA Issue & Receipt Charges

ERQ COMPUTATION

Induction Cost
AMD
Washout Rate
Repair cost
Holding cost

$$ERQ = \sqrt{\frac{2 * \text{Induction Cost} * \text{AMD} * (1-\text{Replacement Rate})}{\text{Cost to Repair} * \text{Holding Cost Rate}}} \Big/ \text{AMD} * (1-\text{Replacement Rate})$$

ERQ Months

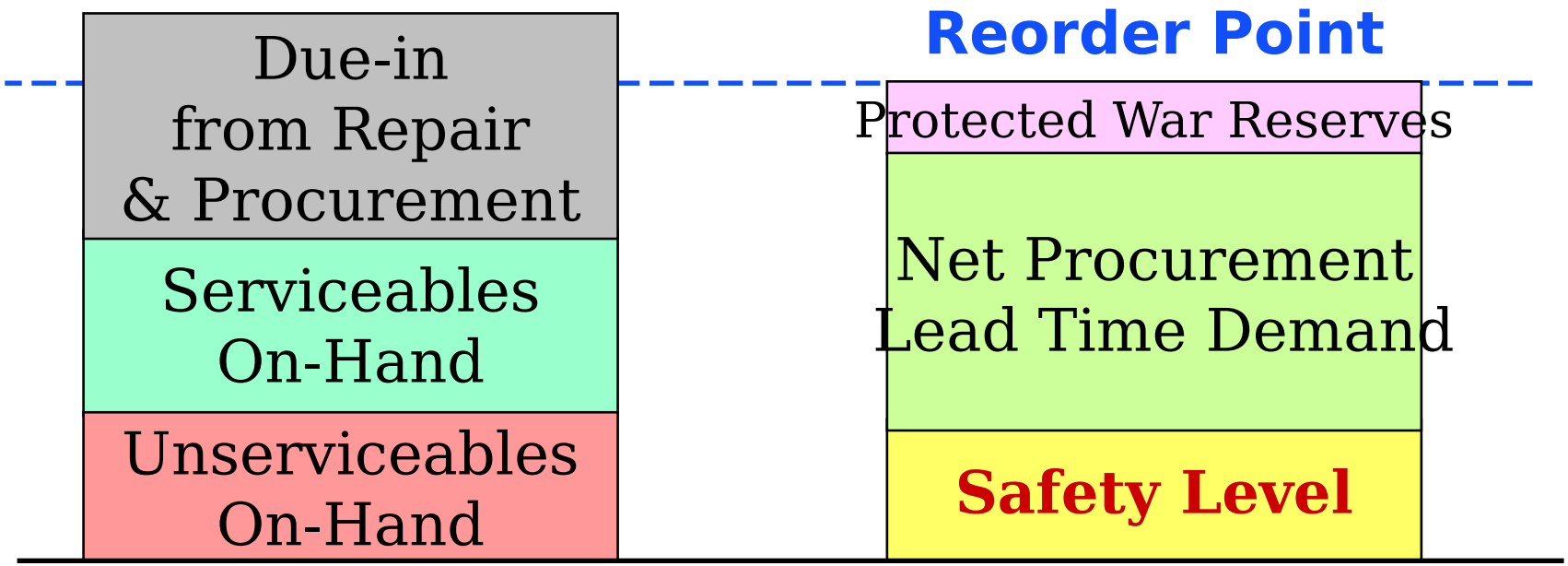


Larger ERQ for smaller $ Value repair programs

Larger ERQ for smaller Holding Cost Rate

ASSETS vs. REORDER POINT

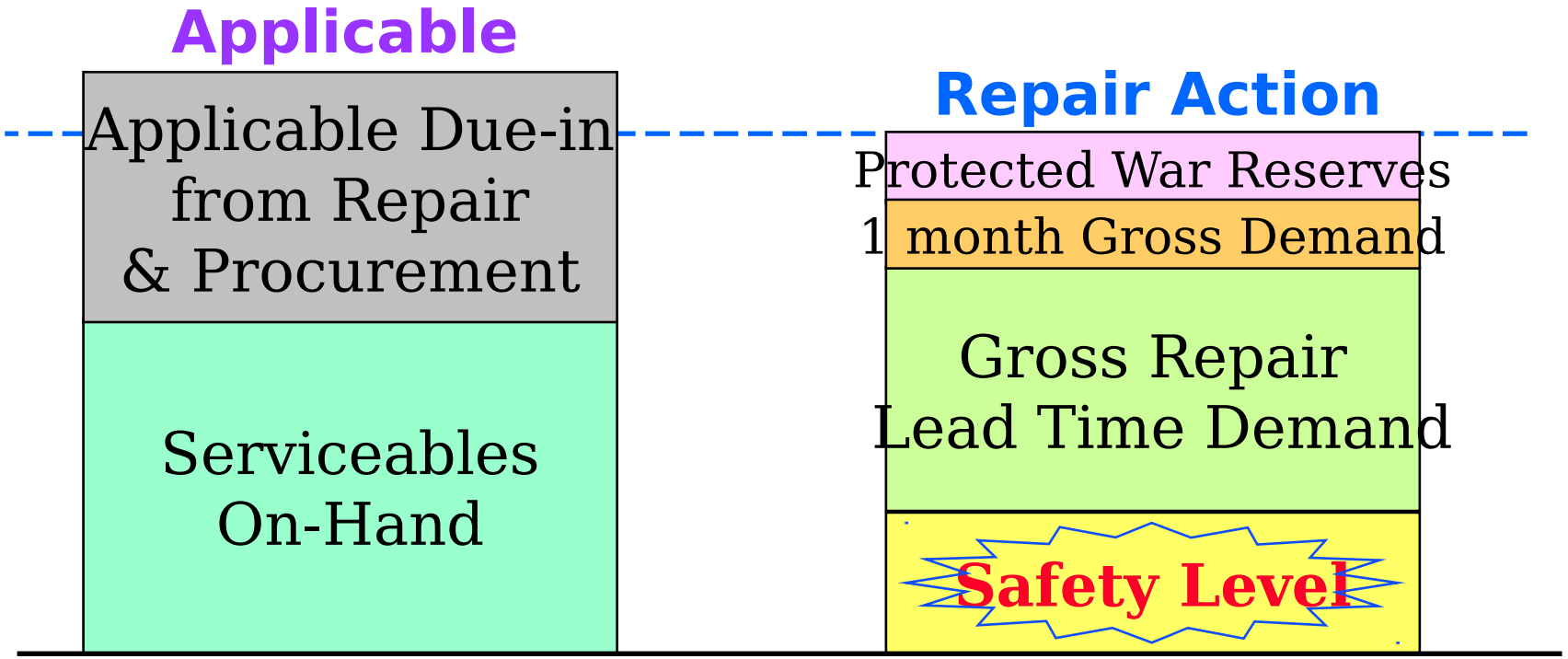
- **Reorder Point used to decide when to Buy**
- **Buy when Assets ≤ Reorder Point**



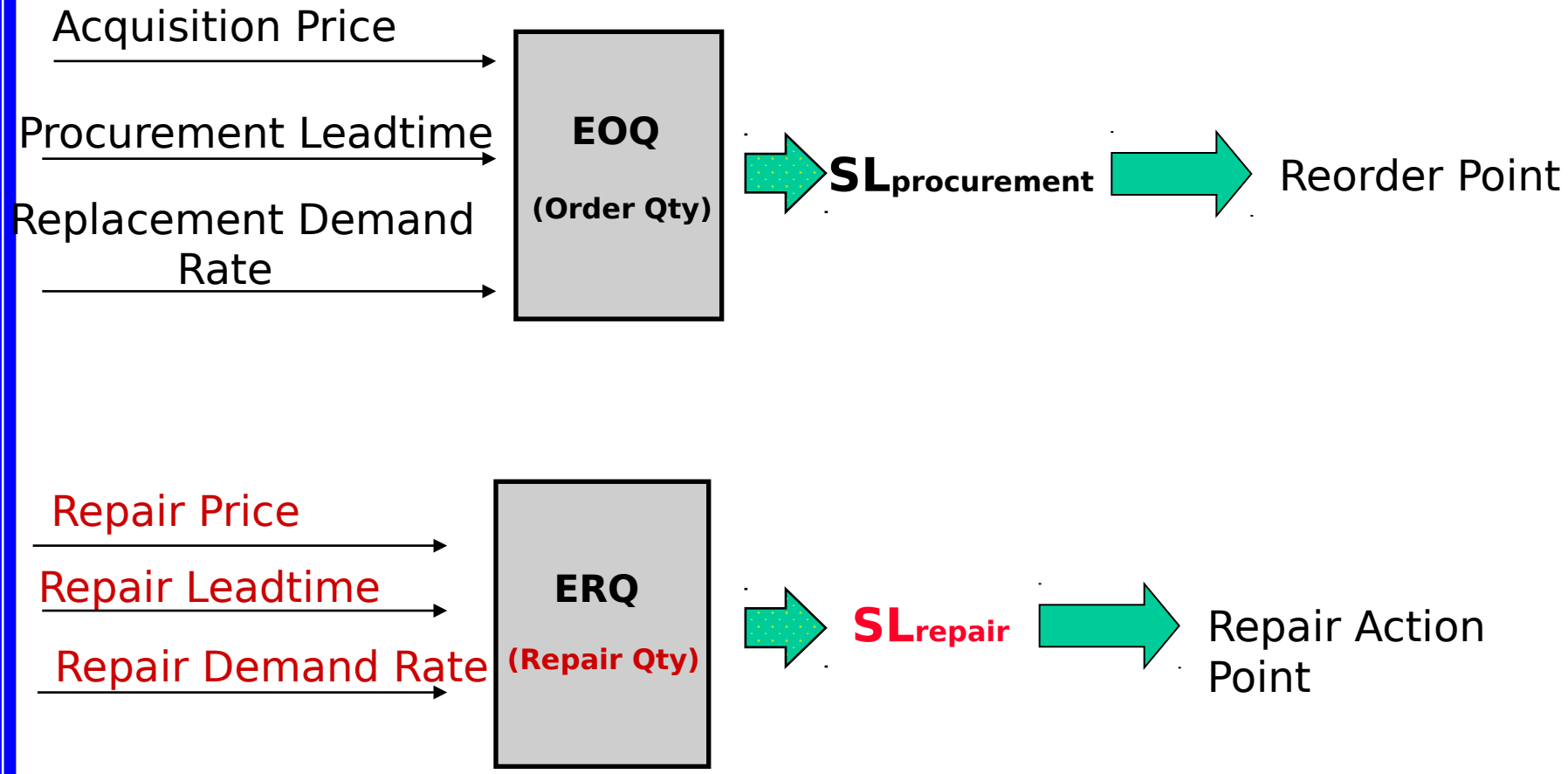
Empirical Safety Level = [(EOQ/2) +SL] x [Procurement Lead Time / 60 months]

ASSETS vs. REPAIR ACTION POINT

- **Repair when Applicable Assets ≤ Repair Action Point**



TWO SAFETY LEVELS



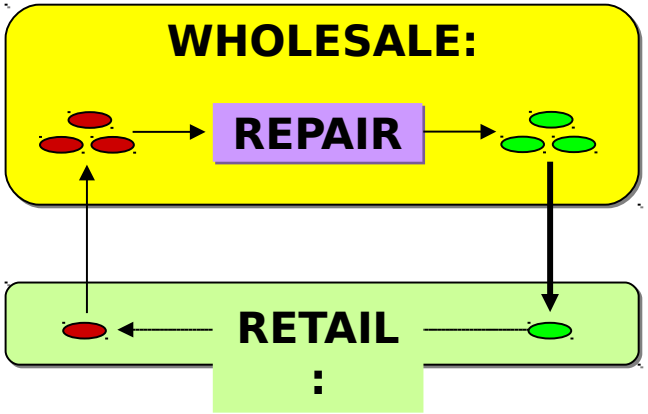
OVERVIEW OF REPAIR ACTION POINT

on't want to induct Too Soon:

- Incur unnecessary additional Holding Cost

on't want to induct Too Late:

- Incur Backorders



o what's the latest we can wait to repair without incurring backorders ?

- In a Perfect World:
  - ✔ Wait until we have just enough units left to fill demand during RLT
  - ✔ Repair Action Point = RLT * AMD

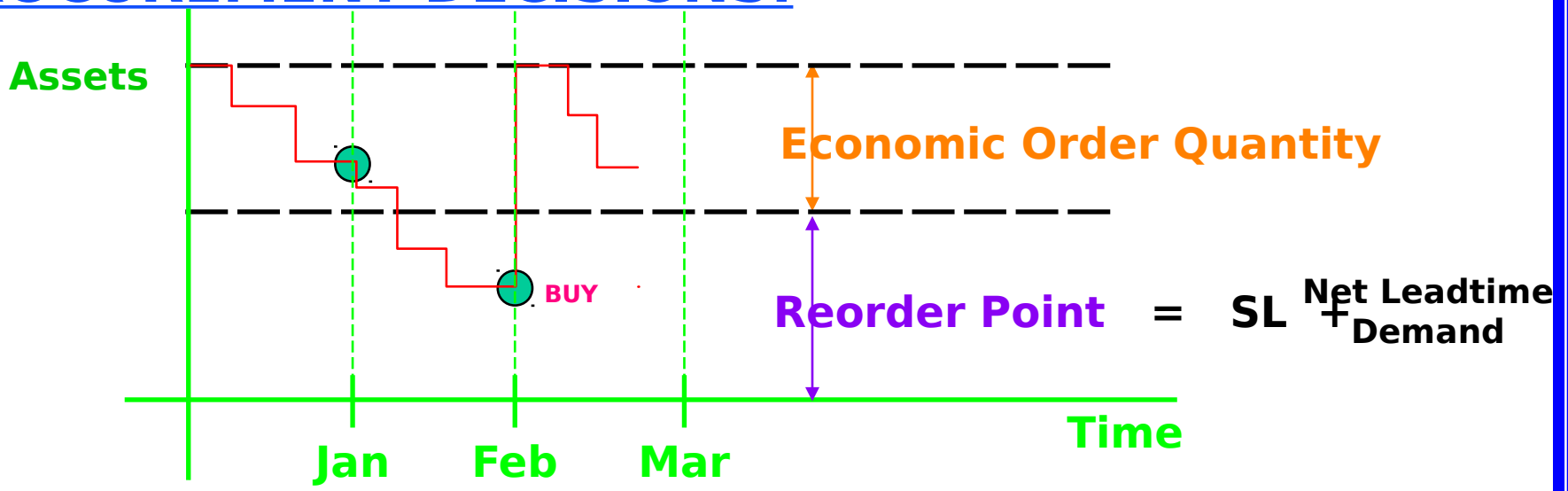
RLT = Repair Lead Time in months
AMD = Average Monthly Demand

- In the Real World:
  - ✔ Add a Safety Level to protect against uncertainty in RLT and AMD
  - ✔ Repair Action Point = (RLT * AMD) + SL

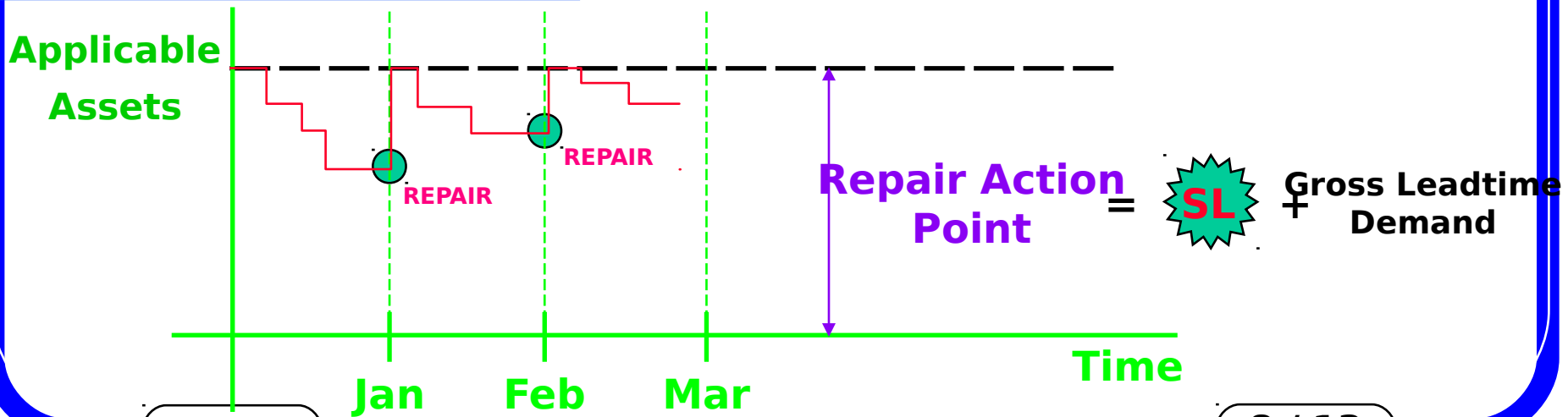
epair-SL considers just repair variability / repair costs

THEORETICAL INVENTORY MANAGEMENT

PROCUREMENT DECISIONS:



REPAIR DECISIONS:

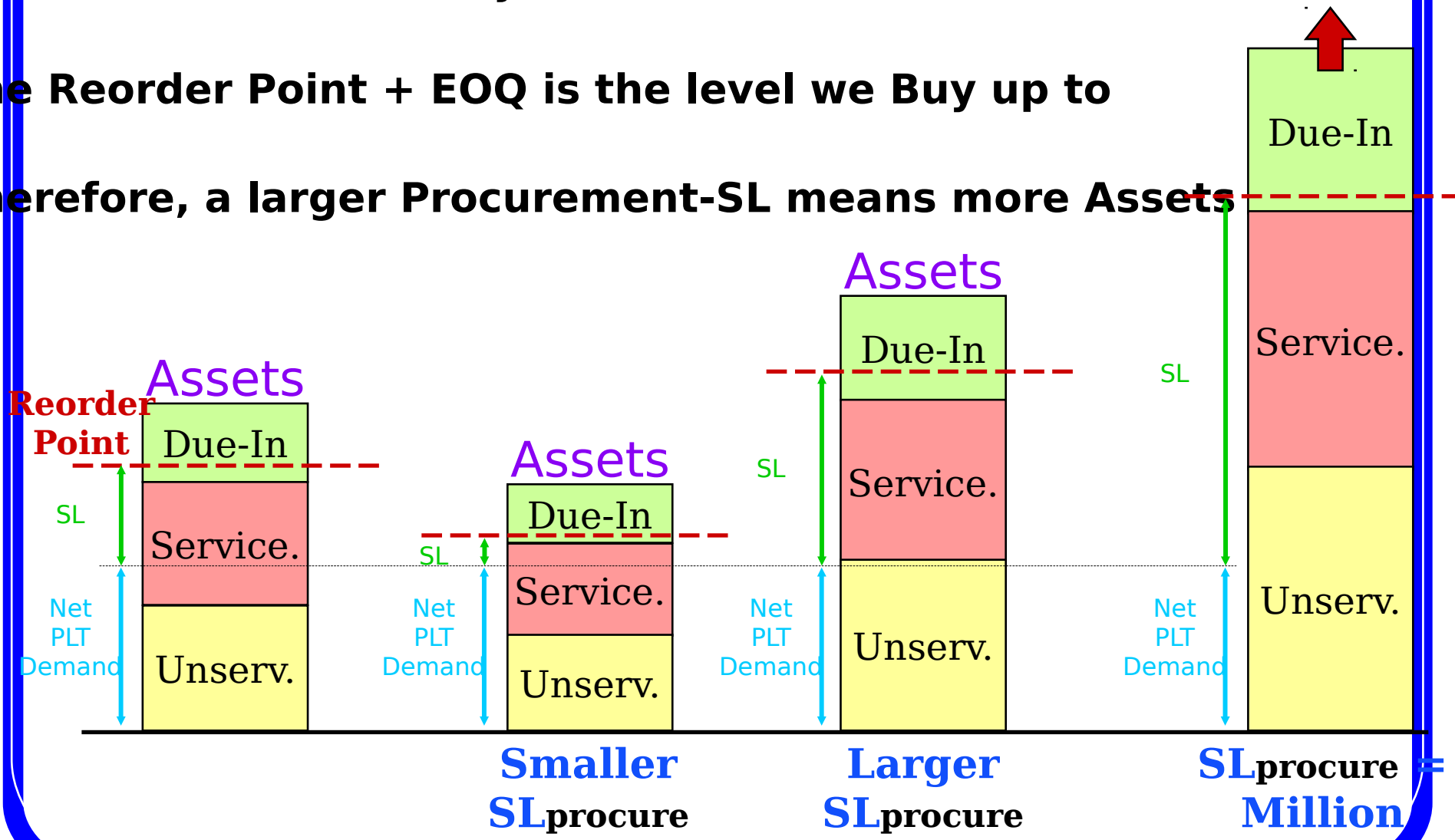


Single Item PROCUREMENT-SL vs. ASSETS

The Procurement-Safety Level is used to calculate the Reorder P

he Reorder Point + EOQ is the level we Buy up to

herefore, a larger Procurement-SL means more Assets



TWO COMMON QUESTIONS

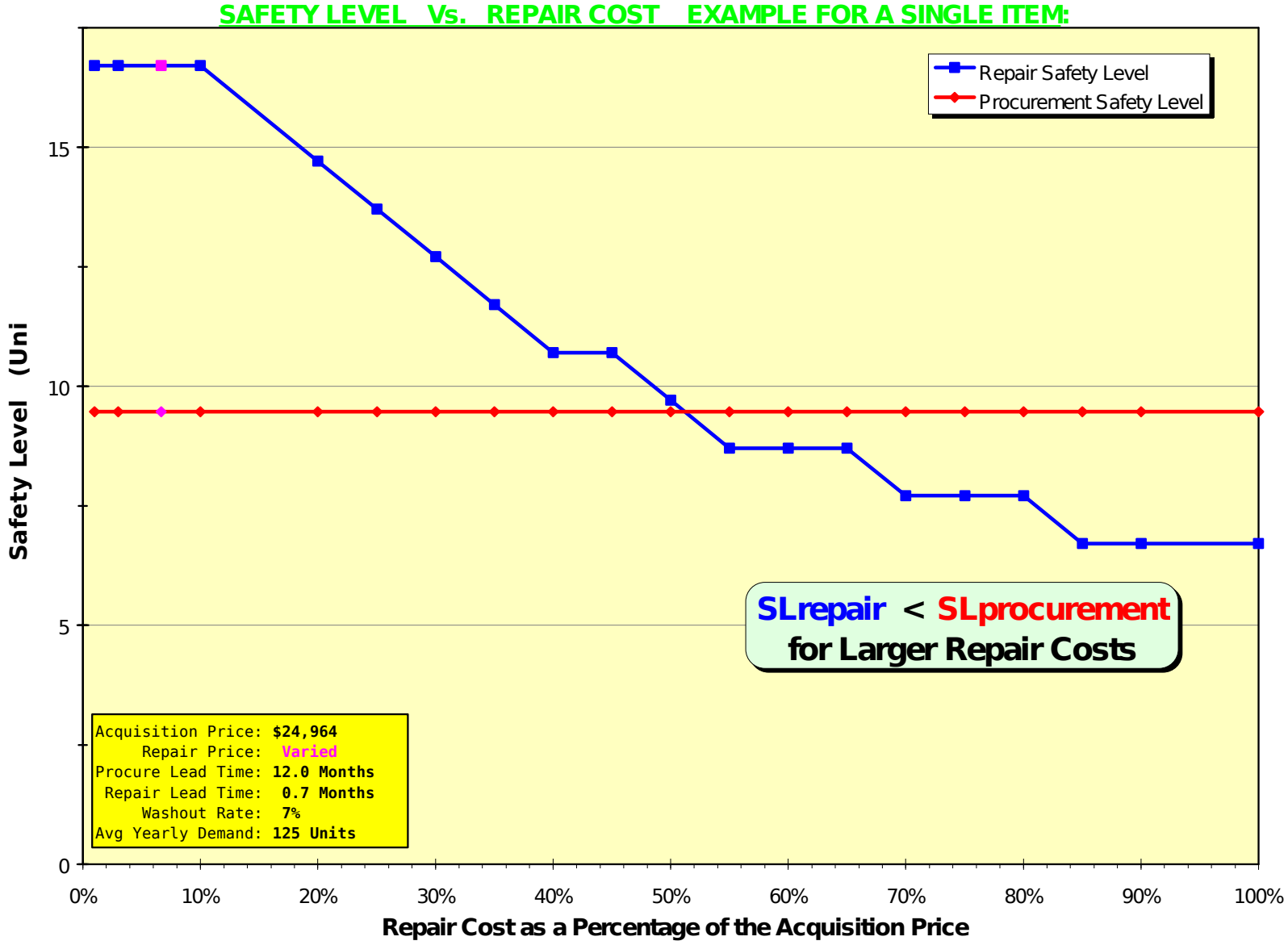
Q1: Is the *Repair Safety Level* always larger than the *Procurement Safety Level* ?

A1: No

Q2: Doesn't *more Safety Level* always mean *more Inventory* ?

A2: No

SAFETY LEVEL vs. REPAIR COST



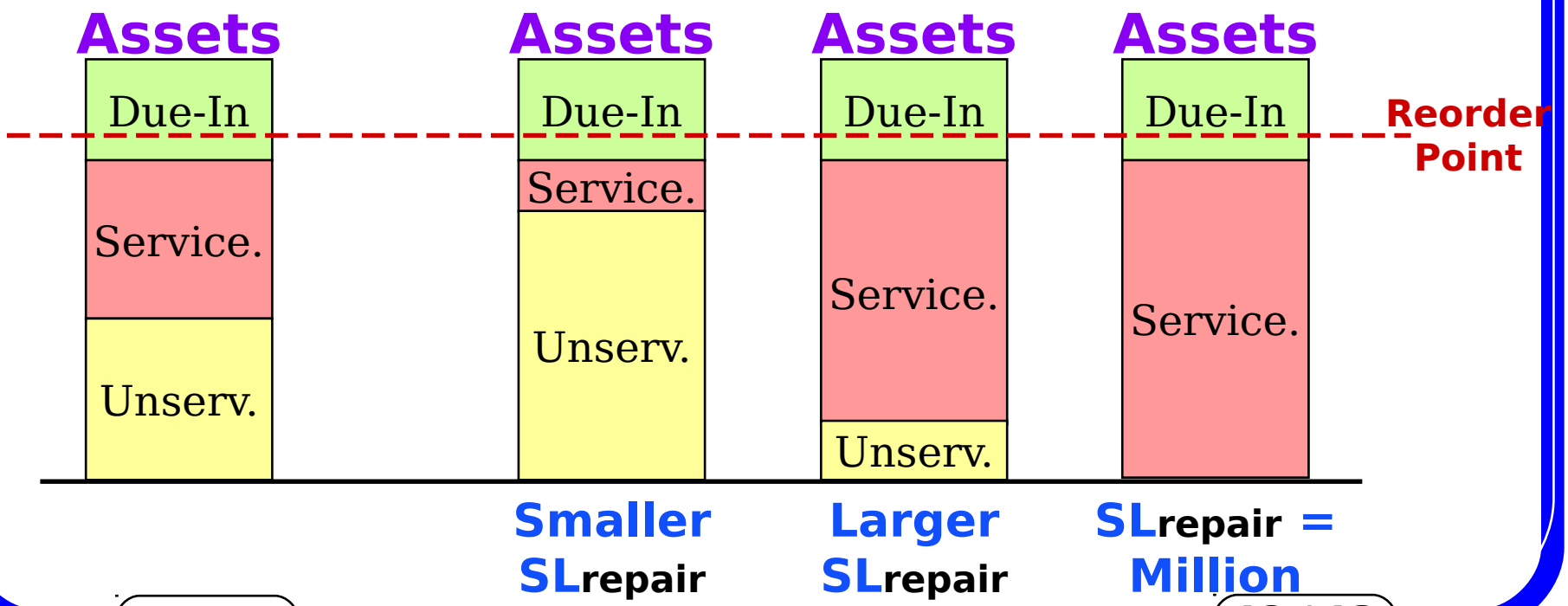
Single Item REPAIR-SL vs. ASSETS

The Repair-Safety Level is used to calculate the RAP

The RAP is used to decide when to Repair

A larger Repair-SL just means we induct more quickly

- **A different mix of Serviceables and Unserviceables**
- **But the same Reorder Point, and the same average Assets**



Repair-Requirement Objective